

communication modes and the availability of several types of protocols. Other features include a modem, multitasking multi-drop networking cards, multiple channel analog and digital I/O cards and any other system required signal-processing cards.

Other peripherals such as graphics and video cards, fixed hard drives, floppy drives, optical worm drives, CRT displays, keyboards, extended RAM and ROM slots may be included. There may be other output devices such as plotters and printers. These systems will have redundant electrical power supplied via in-line battery-backed UPS, regulated and filtered, electrical power from an electrical generating system.

These computer systems have programming installed that works with and controls the incinerator system. The imbedded computer/data acquisition system programming also controls all the waste disposal system and its subsystems or modules. The tasks this programming may control will include sensing of all system and subsystem required parameters, such as but not limited to, temperature, flow, content, levels, adsorption rates, pressures, mechanical and electro-mechanical operation, optical and electro-optical operation, reporting, alarm conditions and all fail safe and monitoring devices on site or from a remote location.

These systems are housed in enclosures constructed of noncorrosive metal with internal shielding to provide for complete isolation from physical contact and ESD damage. Transient voltage suppressors protect the electronics from electrical surges on the power line and field terminal wiring. I/O modules are internally protected from field wiring shorts.

While the present invention has been described with reference to the presently preferred embodiments, it will be appreciated that the invention may be embodied in other specific forms without departing from its spirit or essential characteristics.

Accordingly, the described embodiment is to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All modifications or changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

We claim:

1. A waste disposal apparatus comprising:
  - a first combustion chamber for incinerating waste material in an oxygen rich atmosphere to produce ash and exhaust containing gasses and particulate matter;
  - an injector for blowing air into said first combustion chamber in excess of the amount required for normal combustion;
  - a second combustion chamber for firing said exhaust containing gasses and particulate matter in an oxygen starved atmosphere; and
  - a damper for restricting air flow into said second combustion chamber to an amount less than that required for normal combustion; and
  - a liquid filter for capturing said particulate matter contained in said fired exhaust and for chemically treating said fired exhaust gasses to reduce the quantity of CO, NO and SO contained in said fired exhaust.
2. The apparatus of claim 1 wherein said injector also blows waste material into said first combustion chamber.

3. The apparatus of claim 2 wherein said injector blows said air and waste material into said first combustion chamber along a trajectory that suspends said waste material for a time sufficient to enhance incineration of said waste material. 5

4. The apparatus of claim 1 wherein said first combustion chamber further comprises means for agitating said waste material and said ash in said first combustion chamber. 10

5. The apparatus of claim 1 wherein said exhaust is retained in said second combustion chamber for at least one second. 15

6. The apparatus of claim 5 further comprising means for controlling the direction of exhaust flowing through said second combustion chamber. 20

7. The apparatus of claim 1 further comprising a cooling chamber for mixing outside air with said fired exhaust discharged from said second combustion chamber. 25

8. The apparatus of claim 7 further comprising an electrostatic filter for removing particles from said fired exhaust. 30

9. The apparatus of claim 7 further comprising a reducing catalyst for treating said exhaust to neutralize or remove by-products of combustion contained in said fired exhaust. 35

10. The apparatus of claim 7 further comprising an oxidizing catalyst for converting CO contained in said fired exhaust to CO<sub>2</sub>. 40

11. The apparatus of claim [1] 19 wherein said liquid filter comprises water and either urea or ammonia. 45

12. The apparatus of claim [1] 19 wherein said liquid filter comprises a thickening or jelling agent for increasing the viscosity of said liquid. 50

13. The apparatus of claim [1] 19 wherein said liquid filter includes means for agitating said liquid and for mixing said fired exhaust with said liquid. 55  
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14. The apparatus of claim [1] 19 further comprising means for cooling said filtered exhaust flowing from said liquid filter.

15. A waste disposal system comprising:  
5 means for reducing said waste material and for feeding said reduced material to said first combustion means;  
a first combustion means for incinerating said reduced waste material in an oxygen rich atmosphere  
10 to produce an exhaust containing gasses and particulate matter;  
means for blowing air into said first combustion means in an amount greater than that required for normal combustion;  
15 a second combustion means for firing said exhaust containing gasses and particulate matter in an oxygen starved atmosphere;  
means for controlling air flowing into said second combustion means to an amount less than that required for normal combustion;  
20 means for removing particles from said first exhaust;  
first means for treating said fired exhaust to remove oxides of nitrogen; and  
second means for treating said fired exhaust to accelerate oxidizing reactions in said fired exhaust; and  
25 liquid filter means for capturing said particulate matter contained in said fired exhaust and for chemically treating said fired exhaust gasses to reduce CO, NO, HCL and SO<sub>2</sub> contained in said fired exhaust;  
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16. The waste disposal system of claim 15 wherein each of said means further comprises means for sensing each of said functions.

17. The waste disposal system of claim 16 wherein  
35 each of said sensing means is connected to a means for monitoring and controlling each of said functions.

18. The apparatus of claim [1] 19 further comprising a means for mixing said captured particulate matter in said liquid filter to produce a foam or froth.

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19. The waste disposal apparatus of claim 1 further comprising a liquid filter for capturing said particulate matter contained in said fired exhaust and for chemically treating said fired exhaust gasses to reduce the quantity of CO, NO and SO contained in said fired exhaust.

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20. The waste disposal system of claim 15 further comprising a liquid filter means for capturing said particulate matter contained in said fired exhaust and for chemically treating said fired exhaust gasses to reduce CO, NO, HCL and SO<sub>2</sub> contained in said fired exhaust.

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